

IIT - JEE & MEDICAL FOUNDATION TEST - 1

CLASS IX	IIT & MEDICAL TEST - 1	Max marks : 160 Time : 2 hr
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Instructions :

- I) The Test paper consists of Eighty Multiple choice questions.**
Mathematics 1 to 20, Physics 21 to 40, Chemistry 41 to 60 and Biology 61 to 80.
- II) Each followed by four alternatives A, B, C and D.**
- III) Each correct answer carries 2 Marks.**

	MATHEMATICS	 30 Min
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I. Single Correct Choice Type :

1. If 3 times ' $\frac{5}{8}$ ' is added to 4 times ' $\frac{5}{6}$ ', then the result is
- A) $5\frac{5}{24}$ B) $\frac{125}{24}$ C) $\frac{25 \times 5}{3 \times 8}$ D) All
2. The number $1.\overline{27}$ in the form $\frac{p}{q}, q \neq 0$ is
- A) $\frac{14}{11}$ B) $\frac{14}{9}$ C) $\frac{14}{13}$ D) $\frac{14}{15}$
3. $x = \frac{a^{m+n}}{b^{p+q}}$ and $y = \frac{c^{x+y}}{d^{g-h}}$ are two rational numbers, where $a^2 = b^3 = 64, c^4 = d^2 = 16, x+y = 5, p+q = g-h = 3$ then the rational number between x and y is
- A) 171 B) 513 C) $\frac{1}{3}$ D) $\frac{3}{8}$
4. Express $0.8 + 0.\overline{7} + 0.4\overline{3}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
- A) $\frac{182}{90}$ B) $\frac{181}{90}$ C) $\frac{180}{90}$ D) $\frac{90}{182}$

5. Express $\frac{5}{3}\sqrt{12}$ as a pure surd.
- A) $\sqrt{\frac{300}{3}}$ B) $\sqrt{\frac{100}{9}}$ C) $\sqrt{\frac{100}{3}}$ D) $\sqrt{\frac{300}{4}}$
6. Express $\sqrt[4]{567}$ as a mixed surd in the simplest form.
- A) $4\sqrt[4]{7}$ B) $3\sqrt[4]{7}$ C) $3\sqrt[4]{3}$ D) $3\sqrt[4]{5}$
7. If $3\sqrt{5} + \sqrt{125} = 17.88$, then what will be the value of $\sqrt{80} + 6\sqrt{5}$?
- A) 13.41 B) 20.46 C) 21.66 D) 22.35
8. The smallest number among $\sqrt[3]{4}, \sqrt[4]{5}, \sqrt[4]{7}, \sqrt[3]{8}$ is
- A) $\sqrt[3]{4}$ B) $\sqrt[4]{5}$ C) $\sqrt[4]{7}$ D) $\sqrt[3]{8}$
9. If $A = 4\sqrt{2} + 2\sqrt{3}$ and $B = 4\sqrt{2} - 2\sqrt{3}$, then the value of $(A - B)^2 =$
- A) 48 B) 50 C) 54 D) 60
10. $\sqrt{63} - \sqrt{175} + \sqrt{28}$ is equal to
- A) $2\sqrt{7}$ B) 0 C) $3\sqrt{7}$ D) $\sqrt{7}$
11. Simplify $2\sqrt[3]{40} + 3\sqrt[3]{625} - 4\sqrt[3]{320}$
- A) $3\sqrt[3]{5}$ B) $7\sqrt[3]{5}$ C) $9\sqrt[3]{5}$ D) $5\sqrt[3]{5}$
12. Express $10\sqrt{3}$ as pure surd
- A) $3\sqrt{100}$ B) $\sqrt{100}$ C) $\sqrt{300}$ D) None
- II. Multi Correct Choice Type :**
13. Which of the following rational numbers lie between $-\frac{1}{2}$ and $\frac{1}{2}$
- A) $\frac{3}{10}$ B) 0 C) $\frac{21}{100}$ D) $\frac{2}{3}$
14. Which of the following is true?
- A) $2\sqrt{5}, 3\sqrt{5}, 5\sqrt{5}$ are similar surd B) Every surd is an Irrational
- C) $a \pm \sqrt[n]{b}$ is mixed surd
- D) The product of two similar quadratic surds is a Rational number
15. If $\sqrt{2^n} = 1024$, then $3^{2\left(\frac{n}{4}-4\right)} =$ _____
- A) 3 B) 9 C) $\sqrt{9}$ D) $\sqrt{81}$

16. $4\sqrt{2} + 3\sqrt{2} - 10\sqrt{2} = \underline{\hspace{2cm}}$

A) $-3\sqrt{2}$

B) $7\sqrt{2} - 10\sqrt{2}$

C) $3\sqrt{2}$

D) 0

III. Linked Comprehensive Type:

The recurring part of the non - terminating recurring decimal is called period and the number of digits in the recurring part is called periodicity

17. The period of $\frac{3}{11}$ is

A) 17

B) 27

C) 37

D) 47

18. The periodicity of $\frac{1}{6}$ is

A) 1

B) 2

C) 3

D) 4

19. The periodicity of $\frac{5}{13}$ is

A) 2

B) 4

C) 6

D) 8

IV. Matrix Match Type :

20. **Column I**

a) $\sqrt{8} + \sqrt{32}$

b) $5\sqrt{3} + 2\sqrt{27}$

c) $7\sqrt{48} - 4\sqrt{12}$

d) $15\sqrt{6} - \sqrt{216}$

A) a - p, b - t, c - s, d - q

C) a - r, b - p, c - q, d - t

Column II

p) $11\sqrt{3}$

q) $10\sqrt{12}$

r) $6\sqrt{2}$

s) $7\sqrt{3}$

t) $9\sqrt{6}$

B) a - r, b - p, c - q, d - t

D) a - q, b - p, c - s, d - t

PHYSICS



30 Min

I. Single Correct Choice Type :

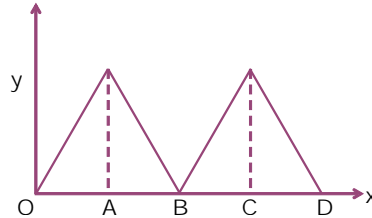
21. In the equation $y = 2x + 3$, y is the _____ quantity.
 A) independent B) dependent C) constant D) all of these
22. The curve for $y = 6x^3$ is drawn its slope is given by $\tan\theta = \frac{dy}{dx} = 18x^2$. Then the slope at $x = 2$ is _____.
 A) 18 B) 24 C) 36 D) 72
23. If $y = \frac{1}{2}x - 3$ then the value of y for $x = 2$ is
 A) 3 B) -2 C) 2 D) zero
24. If $\sec^2\theta = 1$ then $\tan^2\theta =$ _____
 A) 2 B) 1 C) -1 D) zero
25. If $x = a \cos\theta$ and $y = a \sin\theta$ then which of these relations exist between x and y ?
 A) $x^2 + y^2 = a^2$ B) $x^2 - y^2 = a^2$ C) $xy = \frac{a}{2}$ D) $\frac{x}{y} = a$
26. **Assertion** : $\sin 30^\circ = \sin(90^\circ - 60^\circ) = \cos 60^\circ$
Reason : The angle $(90^\circ - \theta)$ lies in first quadrant, all T- ratios are positive.
 A) Both Assertion and Reason are true, Reason is the correct explanation of Assertion
 B) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
 C) Assertion is true and reason is false.
 D) Assertion is false and reason is true.
27. $\cos 75^\circ =$
 A) $\frac{\sqrt{3}+1}{2\sqrt{2}}$ B) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ C) $\frac{1-\sqrt{3}}{2\sqrt{2}}$ D) None
28. $\sin^4 A - \cos^4 A$
 A) $2\cos^2 A - 1$ B) $1 + 2\cos^2 A$ C) $2\sin^2 A - 1$ D) $2\sin^2 A + 1$
29. $1 - \frac{\cos^2 A}{1 - \sin^2 A}$
 A) 0 B) 1 C) $\sin A$ D) $\cos A$
30. Find the value of $\frac{1 - \sin 60^\circ}{\cos 60^\circ}$
 A) $2 - \sqrt{3}$ B) $\sqrt{3} - 2$ C) $1 - \sqrt{3}$ D) $\sqrt{3} - 1$

31. Find the value of x , if $\tan 3x = \sin 45^\circ \times \cos 45^\circ + \sin 30^\circ$
 A) 30° B) 15° C) 40° D) 10°
32. The acute angle θ for which $\sin \theta = \cos \theta$
 A) 30° B) 45° C) 60° D) none of these

II. Multi Correct Choice Type :

33. If $y = 5x + 2$, then the
 A) value of y for $x = 3$ is 17 B) value of y for $x = 2$ is 12
 C) value of y for $x = 5$ is 25 D) value of y for $x = 4$ is 22

34.



For the above graph in which regions is the slope positive?

- A) OA B) AB C) BC D) CD
35. which of the following is correct
 A) $\operatorname{cosec} \theta = \frac{1}{\sin \theta}$ B) $\sec \theta = \frac{1}{\cos \theta}$ C) $\tan \theta = \frac{\sin \theta}{\cos \theta}$ D) $\cot \theta = \frac{1}{\tan \theta}$
36. Pick out incorrect options:
 A) $\cos 240^\circ = -\frac{1}{2}$ B) $\cos \theta = 2 \cos^2 \frac{\theta}{2} + 1$ C) $\cos 120^\circ = -\frac{1}{2}$ D) $\cot 30^\circ = \frac{1}{\sqrt{3}}$

III. Linked Comprehensive Type :

If corresponding to any given value of x , there exists a single definite value of y , then y is called a function of x . This is represented as $y = f(x)$. This equation means that corresponding to one value of x , there is a single definite value of the variable y .

37. If $y = 0.05x + 0.001$, then the value of y for $x = 2$ is
 A) 0.11 B) 0.011 C) 0.0101 D) 0.101
38. If $y = \frac{7}{5}x + 2$, then the value of y for $x = 1$ is
 A) 2.1 B) 17 C) 3.4 D) 1.89
39. If $y = 0.02x + 1.003$ then the value of y for $x = 0.5$ is
 A) 11.03 B) 1.103 C) 10.13 D) 1.013

IV. Matrix Matching Type :

40. Match the following

- | | |
|-------------------------------|-------------------------------|
| a) $\cos 150^\circ$ | p) $\frac{\sqrt{3}}{2}$ |
| b) $\sin 120$ | q) 1 |
| c) $\sin 180^\circ$ | r) $-\frac{\sqrt{3}}{2}$ |
| d) $\tan 225$ | s) 0 |
| A) a - p, b - r, c - s, d - p | B) a - q, b - r, c - p, d - s |
| C) a - r, b - p, c - s, d - q | D) a - q, b - p, c - s, d - r |

CHEMISTRY**30 Min****I. Single Correct Choice Type :**

41. Uncertainty gave the concept of :

- | | |
|---|------------------|
| A) Probability | B) an orbital |
| (C) Physical meaning of ψ and ψ^2 | D) All the above |

42. The uncertainty found from the uncertainty principle $\left(\Delta x \cdot \Delta p = \frac{h}{4\pi}\right)$ is:

- | | |
|-----------------------|-------------------------------|
| A) The minimum value. | B) The maximum value. |
| C) The exact value. | D) Only an approximate value. |

43. The velocity of electron of H-atom in its ground state is $2.2 \times 10^6 \text{ m/s}$. The de-Broglie wavelength of this electron would be

- | | | | |
|------------|------------|------------|------------|
| A) 0.33 nm | B) 23.3 nm | C) 45.6 nm | D) 100 nm. |
|------------|------------|------------|------------|

44. The principle quantum number is related to:

- A) The shape of the orbital
 B) The spatial orientation of the orbital
 C) The average distance of the most electron-dense regions from the nucleus
 D) The number of electrons

45. If Hund's rule is applicable, p^3 configuration is $\boxed{\uparrow \uparrow \uparrow}$ because in this arrangement

- A) electrostatic repulsion is minimum
 B) magnetic attraction with outer magnetic field is maximum
 C) half filled is more stable
 D) all of these

46. The de Broglie wavelength relates to applied voltage as:

A) $\lambda = \frac{12.3}{\sqrt{h}} \text{A}^0$

B) $\lambda = \frac{12.3}{\sqrt{V}} \text{A}^0$

C) $\lambda = \frac{12.3}{\sqrt{E}} \text{A}^0$

D) Both (B) and (C)

47. Among the following for which one mathematical expression $\lambda = \frac{h}{p}$ states:

A) de Broglie equation

B) Einstein equation

C) Uncertainty equation

D) Bohr equation

48. Which of the following technical terms cannot be used to describe both an electron and a photon?

A) wavelength

B) mass

C) energy

D) momentum

49. If the electronic structure of oxygen atom is written as $1s^2 2s^2 2p^4$ it would violate

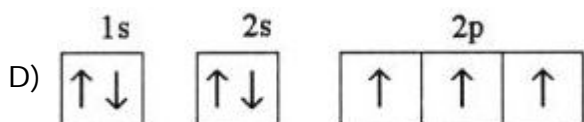
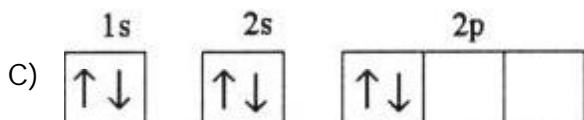
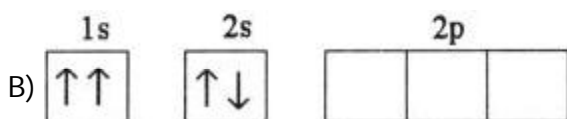
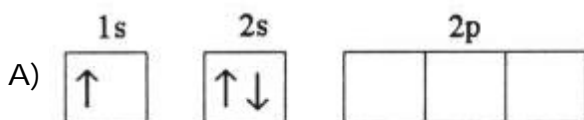
A) Hund's rule

B) Pauli's exclusion principle

C) Both Hund's and Pauli's principles

D) None of these

50. Which electron configuration represents a violation of Hund's rule for an atom in its ground state?



51. Which of the following sets of quantum numbers is not possible?

A) $n=4, l=1, m=0, s=+1/2$

B) $m=4, l=3, m=-3, s=-1/2$

C) $n=4, l=-1, m=+2, s=-1/2$

D) $n=4, l=1, m=0, s=-1/2$

52. If the principal quantum number is 3, the azimuthal quantum number can have values

- A) 1, 2, 3 B) 3,2,1, 0, -1, -2,-3 C) 0, 1, 2 D) $\frac{1}{2}, -\frac{1}{2}$

II. Multiple Response Type Questions

53. Which of the following statement(s) is (are) incorrect?

- A) The path of an electron in an atom can determined accurately.
 B) The exact position and velocity of an electron can be determined simultaneously.
 C) The energy of each orbital is definite.
 D) The minium uncertainty in its velocity cannot be less than $5.8 \times 10^5 \text{m/sec}$

54. de-Broglie wave equation can be written as:

- A) $\lambda = \frac{h}{mv}$ B) $\lambda = \frac{h}{p}$ C) $\lambda = \frac{h}{mc}$ D) $E = mc^2$

55. Which is correct statement in case of Hund's rule?

- A) It states that if more than one atomic orbital of the same energy is available, electrons will occupy different atomic orbitals with parallel spins, as far as possible, in the configuration of lowest energy.
 B) Total energy of many electron atom with more than one electron occupying a set of degenerate orbitals is lowest, if as far as possible, electrons occupy different atomic orbitals and have parallel spins.
 C) Hund's rule forbid any configuration that does not violate the Pauli's exclusion principle.
 D) Hund's rule simply tells us which of the possible configurations is lowest in energy and other configurations are those of excited states, higher in energy than the ground state.

56. According to the Heisenberg uncertainty principle it is impossible to precisely determine an object's position and its _____ at the same time.

- A) energy
 B) momentum along the same direction
 C) momentum along the perpendicular direction
 D) angular momentum

III. Linked Comprehension Type

Electron pairing in p, d and f orbitals cannot occur until each orbital of a given subshell contains one electron each or is singly occupied".

57. In order to occupy the same orbital, two electrons must have _____ .

- A) parallel spins and equal energy
 B) unequal energy and parallel spins
 C) a high quantum number
 D) opposite spins and equal energy

58. According to the Aufbau principle ____.
- A) an orbital may be occupied by only two electrons
 B) electrons enter orbitals of lowest energy first
 C) electrons enter orbitals of highest energy first
 D) electrons in the same orbital must have opposite spins
59. What is next orbital after the 6p orbital is filled completely?
- A) 4f B) 5d C) 5f D) 6d

IV. Matrix Matching type questions

60. **Column I**

- a) $\lambda =$
 b) Planck's law
 c) Dual nature of matter
 d) $mvr =$

Column II

- p) Louis de-Broglie
 q) $E = h\nu$
 r) $\frac{nh}{2\pi}$
 s) $\frac{h}{p}$
 A) a - p, b - r, c - s, d - p
 B) a - q, b - r, c - p, d - s
 C) a - r, b - q, c - p, d - s
 D) a - s, b - q, c - p, d - r

BIOLOGY



30 Min

I. Single Response Type Questions

61. Which of the following can be made into crystal?
- A) A Bacterium B) An Amoeba C) A Virus D) A Sperm
62. Plasmolysis in a plant cell is defined as
- A) Break down (lysis) of plasma membrane in hypotonic medium
 B) Shrinkage of cytoplasm in hypertonic medium
 C) Shrinkage of nucleoplasm
 D) None of them
63. Cell arises from pre-existing cell was stated by
- A) Haeckel B) Virchow C) Hooke D) Schleiden
64. Select the odd one out
- A) The movement of water across a semi permeable membrane is affected by the amount of substances dissolved in it.
 B) Membranes are made of organic molecules like proteins and lipids
 C) Molecules soluble in organic solvents can easily pass through the membrane.
 D) Plasma membranes contain chitin sugar in plants
65. The term 'Cell' was given by -
- A) Leeuwenhoek B) Robert hooke C) Flemming D) Robert Brown

66. Name of the process that requires energy provided by ATP -
A) Diffusion B) Osmosis C) Active transport D) Plasmolysis
67. Chromosomes are made up of
A) DNA B) Protein C) DNA and protein D) RNA
68. Amoeba acquires its food through a process, termed
A) Exocytosis B) Endocytosis
C) Plasmolysis D) Exocytosis and endocytosis both
69. The only cell organelle seen in prokaryotic cell is
A) Mitochondria B) Ribosomes C) Plastids D) Lysosomes
70. The largest cell in the human body is -
A) Nerve cell B) Muscle cell C) Liver cell D) Kidney cell
71. Organisms lacking nucleus and membrane bound organelle are -
A) Diploids B) Prokaryotes C) Haploids D) Eukaryotes
72. Chromatin consists of -
A) RNA B) DNA
C) RNA and histones (proteins) D) DNA and histones (proteins)
73. Plasmolysis in a plant cell is defined as
A) Break down (lysis) of plasma membrane in hypotonic medium
B) Shrinkage of cytoplasm in hypertonic medium
C) Shrinkage of nucleoplasm
D) None of them
74. Which of the following are covered by a single membrane?
A) Mitochondria B) Vacuole C) Lysosome D) Plastid
75. Find out the false sentences
A) Golgi apparatus is involved with the formation of lysosomes
B) Nucleus, mitochondria and plastid have DNA; hence they are able to make their own structural proteins
C) Mitochondria is said to be the power house of the cell as ATP is generated in them.
D) Cytoplasm is called as protoplasm
76. Which cell organelle plays a crucial role in detoxifying many poisons and drugs in a cell?
A) Golgi apparatus B) Lysosomes
C) Smooth endoplasmic reticulum D) Vacuoles
77. The proteins and lipids, essential for building the cell membrane, are manufactured by
A) Rough endoplasmic reticulum B) Golgi apparatus
C) Plasma membrane D) Mitochondria
78. The undefined nuclear region of prokaryotes are also known as
A) Nucleus B) Nucleolus C) Nucleic acid D) Nucleoid

79. Assertion : Colourless plastids are known as Chromoplasts

Reason : Chromoplasts gives colour to flowers

- A) If both assertion and reason are true and reason is the correct explanation of assertion.
- B) If both assertion and reason are true but reason is not the correct explanation of assertion.
- C) If assertion is true but reason is false.
- D) If assertion is false but reason is true.

80. **Matrix Matching type questions**

Column-I

- a) Ribosomes
- b) Chloroplast
- c) Lysosome
- d) Leucoplasts
- e) Chromoplasts

- A) a - p, b - r, c - s, d - p, e - t
- C) a - r, b - q, c - p, d - s, e - t

Column -II

- p) Colourless plastids
- q) Green plastid
- r) Coloured plastid
- s) Suicidal bag
- t) Protein synthesis

- B) a - t, b - q, c - s, d - p, e - r
- D) a - q, b - p, c - s, d - r, e - t

**** ALL THE BEST ****